| 1886. | Average number of micro-organisms found in 10 litres of air by Hesse's method. |
|---|---|
| January | 4 |
| March | 26 |
| May | 31 |
| June | 54 |
| July | 63 |
| August | 105 |
| September | 43 |
| October | 35 |

Experiments are also recorded showing the enormous increase in the number of micro-organisms present in the air of rooms consequent on crowding. In illustration of this point the authors cite a series of experiments made in the Library of the Royal Society during the evening of the conversazione in June last, on which occasion the following results were obtained:—

| Royal Society's Library. | Number of micro-organisms found in 10 litres of air. |
|---|---|
| June 9, 1886. | |
| 9.20 p.m. | 326 |
| 10.5 „ | 432 |
| June 10, 1886. | |
| 10.15 a.m. | 130 |

In addition to determining the number of organisms present in a given volume of air, the authors have also, in each case, roughly estimated the number falling on a given horizontal surface by exposing dishes filled with nutrient gelatine and of known superficial area, as in the experiments previously published.

IV. "On the Intra-ovarian Egg of some Osseous Fishes." By Robert Scharff, Ph.D., B.Sc. Communicated by Professor McIntosh, F.R.S. Received November 17, 1886.

(Abstract.)

These researches were carried out while acting as assistant to Professor McIntosh, at the St. Andrew's Marine Laboratory. The chief material consisted of the intra-ovarian ovum of the gurnard (*Trigla gurnardus*). Many other marine forms, however, were examined.

The paper has been divided into the following five paragraphs:—

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I. *The Nucleus and its Changes in the Smaller Ova.*

In the smallest ova the nucleus occupies almost the whole of the interior, and the nucleoli are mostly attached to the inner surface of the nuclear wall. In somewhat larger eggs, the protoplasm surrounding the nucleus has increased, and is seen to be divided into a darker internal portion and a lighter external one. The ring of dark protoplasm becomes separated off from the nucleus in the later stages, and ultimately disappears. The dark protoplasm has no doubt originated from the nucleus. The view that this has been caused by a substance being added from the nucleus is considerably strengthened by an observation made by Ransom, and published in the 'Philosophical Transactions,' 1867. He found in fact that the germinal spots were soluble in some of the constituents of the yolk. At this stage the spots become vacuolate, and assume a variety of different forms, until the nucleus enters a new phase in the development of the intra-ovarian egg described in the following paragraph.

II. *The Larger Ova and the Formation of the Yolk Spherules.*

The egg has almost reached its final size, although far from being mature, when the nucleus is seen to have shrunk a little, and from it project protuberances on all sides. These protuberances or diverticula, most of which contain nucleolar particles, are ultimately constricted off from the nucleus, and travel towards the periphery of the egg. A similar transformation of the nuclear contents has recently been observed by Balbiani, Roule, and Fol, in invertebrate ova, and by Will, in amphibia. The buds with their enclosed contents form the yolk spherules, the solid mass in their interior soon breaking up into fine granules. Both Gegenbaur and Balfour speak in support of the view that yolk spherules originate within the egg. As the egg reaches maturity the nucleus degenerates still more, but I believe it never entirely disappears.

III. *The Egg Membranes.*

Much has been written on this subject, and it is still doubtful how many membranes exist. Almost all observers, however, agree that in the mature egg there is a membrane pierced by minute pores, which has generally been called "zona radiata," though other terms, such as vitelline membrane, egg-capsule, &c., have been applied to it. In the intra-ovarian egg of the gurnard I found a semi-fluid layer inside the zona, corresponding to the "helle Randschicht" described by Gegenbaur in the ova of birds and reptiles. It disappears in the ripe ovum. No membrane external to the zona, such as mentioned by various observers, was seen in this or other fish eggs.

With regard to the pores in the zona radiata, it seems very probable

that they are filled with processes from the follicular epithelium, and that the egg is nourished in this manner. In the ova I examined I could not see any processes, but they have been noticed by other observers in larger eggs of fishes, as well as of reptiles and mammals.

### IV. *The Follicular Layer.*

The follicular layer in the mature ovum consists usually of a layer of closely-set cells, which, seen from above, have an hexagonal appearance. A peculiar modification of the follicular cells is found in the shanny's egg (*Blennius pholis*). On one-half of the egg's surface the cells are elongated, their depth gradually increasing towards a central point. In this way the depth of the cells varies from 0·007 mm. to 0·032 mm. I never noticed follicular cells passing through the zona radiata, as has been described by many authors.

### V. *Development.*

No observation was made as to the origin of the egg, and it could not be determined whether the ovum originated from a simple transformation of an epithelial cell, or whether several unite, as in "elasmobranchs." I am inclined to the belief, however, that Brock's and Kolessnikow's views are correct, according to whom only one cell is concerned in the formation of the primitive egg. In small ova the follicular epithelium is composed of a few large cells. There are several possible ways in which the follicular layer might have originated, either by an aggregation of epithelial cells round the ovum, as in elasmobranchs, or by a collection of connective tissue cells at the periphery of the ovum, or from the nucleus, as in many invertebrates. I have not been able to come to any definite conclusion on this subject.

The egg membranes appear after the follicle. The zona radiata is formed first, and, as well as the zonoid layer, it takes its origin from the yolk.

## V. "Note on a New Form of Direct Vision Spectroscope." By G. D. Liveing, M.A., F.R.S., Professor of Chemistry, and J. Dewar, M.A., F.R.S., Jacksonian Professor of Natural Philosophy, University of Cambridge. Received November 18, 1886.

Direct vision spectroscopes are very useful in the observation of shifting objects, such as auroræ and other meteors. They are generally in request for telescopic work, and also in all cases where rapidity of observation is of consequence. Ordinary direct vision